

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in this application:

LISTING OF CLAIMS:

Claims 1 to 9. (Canceled).

10. (Previously Presented) A friction-welding device for integrally joining components, each component including a welding surface, comprising:

an oscillator adapted to generate a defined periodic movement of one of the components and the welding surface of the one of the components relative to another one of the components that is held statically during welding and to the welding surface of the another one of the components, the period movement including directions of movement parallel to the welding surfaces;

a compression device adapted to press the welding surfaces of the one of the components and the another one of the components against each other at a defined force; and

a cartridge adapted to accommodate the one of the components outside of a welding zone;

wherein the oscillator includes an even number of piezoactuators arranged in pairs at least approximately on a line of application, the piezoactuators prestressable with respect to the cartridge under pressure generation from opposite sides by piezoelectric liner deformation, the piezoactuators displaceable with the cartridge and the one of the components synchronously oscillatingly at cartridge-side ends.

11. (Previously Presented) The friction-welding device according to claim 10, wherein the components include hydraulically effective blades having one of (a) disk- and (b) ring-shaped blade carriers.

12. (Previously Presented) The friction-welding device according to claim 10, wherein the friction-welding device is adapted to produce and repair integrally bladed rotor components of turbo machines.

13. (Previously Presented) The friction-welding device according to claim 10, wherein the compression device includes at least one piezoactuator having a piezoelectrically movable end couplable to the cartridge to introduce a defined compression force perpendicular to the welding surfaces.

14. (Previously Presented) The friction-welding device according to claim 10, further comprising a device adapted to enlarge relatively small, linear motions of the piezoactuators to generate greater movements having at least one of (a) straight and (b) curved paths.

15. (Previously Presented) The friction-welding device according to claim 10, wherein the device includes at least one of (a) a mechanical gear, (b) a lever mechanism, (c) a flat spring arrangement, (d) a cam gear and (e) a crank control.

16. (Currently Amended) ~~The friction-welding device according to claim 10, A~~ friction-welding device for integrally joining components, each component including a welding surface, comprising:

an oscillator adapted to generate a defined periodic movement of one of the components and the welding surface of the one of the components relative to another one of the components that is held statically during welding and to the welding surface of the another one of the components, the period movement including directions of movement parallel to the welding surfaces;

a compression device adapted to press the welding surfaces of the one of the components and the another one of the components against each other at a defined force; and

a cartridge adapted to accommodate the one of the components outside of a welding zone;

wherein the oscillator includes an even number of piezoactuators arranged in pairs at least approximately on a line of application, the piezoactuators prestressable with respect to the cartridge under pressure generation from opposite sides by piezoelectric liner deformation, the piezoactuators displaceable with the cartridge and the one of the components synchronously oscillatingly at cartridge-side ends;

wherein the friction-welding device is adapted to join blades to one of (a) a disk- and (b) a ring-shaped blade carrier, lines of application of the piezoactuators

extending transversely to a longitudinal center axis of the blade carrier, a first pair of piezoactuators engaging with a front end of the cartridge from opposite sides on a line of application axially in front of the blade, a second pair of piezoactuators engaging with a rear end of the cartridge from opposite sides on a line of application axially behind the blade.

17. (Withdrawn) The friction-welding device according to claim 10, wherein the friction-welding device is adapted to join blades to one of (a) a disk- and (b) a ring-shaped blade carrier, lines of application of the piezoactuators extending transversely to a longitudinal center axis of the blade carrier, two first pairs of piezoactuators, each arranged on a line of application, engaging with a front end of the cartridge from opposite sides, axially in front of the blade at different radial heights relative to the longitudinal center axis of the blade carrier, two second pairs of piezoactuators, each arranged on a line of application, engaging with a rear end of the cartridge from opposite sides, axially behind the blade, at different radial heights relative to the longitudinal center axis of the blade carrier.

18. (Previously Presented) The friction-welding device according to claim 16, wherein at least one pair of piezoactuators engaging with the axially front end of the cartridge are moveable in relation to at least one pair of piezoactuators engaging with the axially rear end of the cartridge, are movable at a same frequency, with one of (a) a same and (b) a different amplitude and in one of (a) an in-phase and (b) a phase-shifted manner.

19. (Withdrawn) The friction-welding device according to claim 17, wherein geometrical zero points of the oscillation movements of the first pairs of piezoactuators are displaceable relative to one another, geometrical zero points of the oscillation movements of the second pairs of piezoactuators displaceable relative to one another.

20. (Previously Presented) The friction-welding device according to claim 10, wherein a force/path characteristic of the piezoactuators is selected by geometrical serial and parallel connection of piezoelements.

21. (Previously Presented) The friction-welding device according to claim 10, wherein a maximum required electrical voltage of the piezoactuators is limited by electrical serial and parallel connection of piezoelements.